

CLAIMS

What is claimed is:

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1. A rotational angioplasty device comprising:

a handle housing;

10 a rotatable prime mover carried by a prime mover carriage which is disposed within the handle housing, the prime mover carriage being longitudinally movable with respect to the handle housing;

15 an exchangeable drive shaft cartridge removably attachable to the handle housing further comprising:

a tubular core element mounted within the cartridge;

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a longitudinally movable tube disposed within the tubular element and having a proximal end portion which is removably attachable to the prime mover carriage for longitudinal movement therewith;

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a rotatable flexible drive shaft having a proximal portion which is disposed within the longitudinally movable tube and a distal portion which includes a tissue removal implement, said proximal portion having a shank at its proximal end;

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a drive shaft attachment mechanism removably attaching the shank of the drive shaft to the prime mover; and

5 a coupling for connecting said moveable tube with said prime mover carriage and adjusting the relative position of said moveable tube and said proximal portion of said drive shaft, said coupling further comprising:

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a prime mover carriage coupling element fixed to said prime mover carriage having a first surface forming one part of a coupling interface;

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a second surface forming a second part of said coupling interface constructed on said moveable tube, said first and second coupling surfaces overlapping in a telescoping manner to form the coupling interface;

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a retention groove constructed in one of said first and second coupling surfaces in said interface;

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an index groove constructed in one of said first and second coupling surfaces in said interface;

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an annular resilient element positioned in said retention groove and exerting a radial force between said first and second coupling surfaces; said resilient element expanding

into said index groove when said retention and index grooves are aligned;

5 wherein, in said aligned relation, the moveable tube and said proximal portion of said drive shaft are relatively positioned to allow rotation of said drive shaft within said moveable tube.

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2. A rotational angioplasty device, as described in claim 1, wherein said shank is constructed with a radial extending flange to engage abutment surfaces on said moveable tube during axial movement of said tube
15 and wherein, in said aligned position of said retention groove and said index groove, said flange is disengaged from said abutment surfaces.

3. A rotational angioplasty device, as described in
20 claim 1, wherein said retention groove is constructed in said first coupling surface and said index groove is constructed in said second coupling surface.

4. A rotational angioplasty device, as described in
25 claim 1, wherein said retention groove is constructed in said second coupling surface and said index groove is constructed in said first coupling surface.

5. A rotational angioplasty device, as described in
30 claim 1, wherein said retention groove is constructed having rectangular cross section.

6. A rotational angioplasty device, as described in claim 1, wherein said index groove comprises an area of

reduced diameter from said coupling surface defined by a first cam surface inclined from said area in a first axial direction and a second cam surface inclined from said area in a second axial direction, said second
5 axial direction being 180° from said first axial direction.

7. A rotational angioplasty device, as described in claim 6, wherein said annular resilient element tends
10 to be centered in said area of reduced diameter by the action of said radial spring force on said first and second cam surfaces.

8. A rotational angioplasty device, as described in claim 1, wherein said annular resilient element
15 comprises a canted coil spring.

9. A rotational angioplasty device, as described in claim 1, wherein to operationally engage the removable
20 drive shaft cartridge to the prime mover, said shank is first fully engaged with said prime mover, wherein, in such position, the annular resilient element is engaged with the most forward of said first and second cam surfaces to generate a force on said prime mover
25 carriage to urge said prime mover carriage in a direction which tends to longitudinally align the annular resilient element with the index groove.